Influence of erbium concentration on spectroscopic properties of tellurite based glass

ABSTRACT

Erbium zinc borotellurite, {[(TeO2)0.70(B2O3)0.30]0.7 (ZnO)0.3}1-y (Er3O2)y glasses were prepared by rapid melt-quenching method. The structural properties of the glass samples were determined by using x-ray diffraction (XRD) method and was confirmed its amorphous nature. The FTIR analysis shows that the Erbium Oxide increases the number of non-bridging oxygen that affects the bonding structure of TeO2, ZnO and B2O3. The absorption edge gives the value of band gap Eopt and Urbach energy æE. The value of Eopt lies between 3.025 eV and 3.440 eV for indirect band gap and between 3.500 eV to 3.680 eV in the direct band gap. The Urbach energy shows non-linear with the concentration of Erbium Oxide and varies within 0.153 eV and 0.200 eV.

Keyword: Optical materials; Fourier transform infrared spectroscopy (FTIR); Optical band gap